forthwith fixed upon it, the whole project being to be perfected in two years, when the bridge will be opened with great *éclat*.

The structure will consist of seven arches. The span of the centre one will be 156 feet, and of the three arches on either side 143 feet, 125 feet, and 107 feet respectively. Another arch will be devoted to a species of swivel bridge, 70 feet wide, for the admission of ships to and from the Custom-house. The buttresses of the piers will present to the current a sharp inclined plane, so that a descending iceberg running upon them will fall to pieces from its own gravity. The bridge will be very flat, there being a fall of only seven feet from the top of the centre arch to the end of the last arch on either side. The average depth of the water in the Neva here throughout the year is about 30 feet, and as the river is a tideless one, there is little variation, except where the wind sets strongly up from inwards the gulf, when the waters rise considerably in some instances, doing irreparable damage. As the shores of the Neva on either side are extremely low, the height of the crown of the centre arch from the water's edge will be only 21 feet; the spring of the arch but 6 feet. The extreme length of the bridge from one abutment to the other will be no less than 1,078 feet. The weight of iron above will be nearly 8,000 tons: independent of the lamps and superb balustrades with which it is the emperor's intention to adorn it, and which together will probably weigh from 1,000 to 2,000 tons more.

An idea cannot yet be formed of the cost of the whole undertaking, but the price of the iron part alone will probably exceed 100,000*l.*; much of the labour to be bestowed upon, and the machines to be constructed expressly for it, being very expensive. The segments of the arches have to be placed with the greatest precision, and the best possible workmanship devoted throughout the details. The weight of iron will exceed by nearly five-fold that consumed in the construction of the Menai Bridge. Altogether, the Neva Bridge will be a most surprising evidence of what the skill and enterprise of a private British firm are able to accomplish, and that such an undertaking should have devolved on a Liverpool house, constitutes an epoch in the commercial progress of the locality. There are three boat bridges on the Neva, and it is highly probable they will be replaced with iron ones, when that under notice shall have come into use.—*Abridged from the Liverpool Journal.*

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The first meeting of the general committee was held on the 25th ultimo at the Council Chamber, in the Guildhall, York. The chair was taken by the Right Hon. the Earl of Rosse, the President at the last meeting at Cork, who was supported by the Marquis of Northampton, Earl Fitzwilliam, the Earl of Enniskillen, the Deans of Ely and Manchester, Professor Whewell, the Master of Trinity, the Rev. W. Vernon Harcourt, the Rev. Dr. Scoresby, and most of the leading members. On no previous occasion was the attendance more numerous and efficient.

Colonel Sabine, the general secretary, read the Report of the council for the past year. In reference to a recommendation of the general committee at Cork, meeting last year, an application had been made to the Board of Ordnance requesting their aid in making experiments with captive balloons, and from which orders had been issued to the commandant at Woolwich to afford every facility for carrying out their plans. Another recommendation to her Majesty's Government respecting the Ordnance maps in Ireland now in progress had also been attended to. It was to introduce a series of contour lines, which, shewing the elevation of the surface of the country, would be useful to a variety of mechanical and engineering purposes. Amongst other cases of their probable utility was that of subserving mining operations, being instrumental in the formation of cheap roads and the improvement of farms; in facilitating drainage and irrigation, and improving the sanatory condition of towns; in sinking artesian wells, and expediting the formation of roads, railways, and canals, and other purposes of public utility. If such were introduced now, by means of the large and efficient disposable staff which the survey had at command, it would save a great expense in the future special surveys for public works and the undertakings of private enterprise. The additional expense to be incurred would not exceed 10,000*l.*, and it was suggested that the electrotype manipulation might be easily adapted to the purpose. An interview which a deputation from the council had held with Sir G. Clerk on behalf of her Majesty's Government, respecting the publication of the results of Professor Forbes's dredging in the Ægean Sea, had also been successful.

Colonel Sabine, in the absence of Mr. J. Taylor, F.R.S., read his accounts as treasurer. They announced the total receipts of the past year as 2,657*l.* 15s., of which amount there had been received from life compositions, 160*l.*; annual subscriptions, 466*l.*; ladies' tickets, 160*l.*; sectional tickets, 33*l.*; compositions for book subscriptions, 66*l.*; sale of reports, 131*l.* 9s. 11d.; dividend on stock, 165*l.*; balance at the last report, 496*l.* 5s. 1d.; and the sum of 1,000*l.* received from her Majesty's Treasury. There had been expended by the treasurer at the Cork meeting, and for incidental expenses, 317*l.* 3s. 3d.; printing the reports, 344*l.* 12s. 6d.; engraving, 42*l.* 7s.; salaries for the secretary and accountant, 450*l.*; and on various grants, 1,047*l.* 10s. 8d., leaving a present balance of about 460*l.*

The active business of the various scientific sections commenced the following morning. As usual on the first day of meeting, the communications were neither numerous nor very important. The sectional rooms were very well attended, but much inconvenience was experienced by members from their want of proximity to each other, owing to the city being somewhat limited in its means of accommodation. Amongst the arrivals on the first day, were Sir Thomas Deane, Sir Isambard Brunel, Sir John M'Neill, the Dean of York, Professors James and Edward Forbes, Professor Adam Sedgwick, Dr. De Hamel, from St. Petersburg, Mr. Leonard Horner, F.R.S., Professor Latham, Sir T. D. Legard, Archdeacon Wilberforce, Professor Walker, of Oxford, &c. The sections commenced at the usual hour of 11 o'clock.

Section G.—Mechanical science, President, Mr. G. Rennie; Vice-presidents, Mr. E. Hodgkinson, F.R.S., Mr. J. Scott Russel, F.R.S.E., and Mr. J. Taylor, F.R.S.; Secretaries, Professor Vignolles and Mr. T. Webster.

The communications made were—

1. Mr. Wylson, on a new Scantlometer.
2. Remarks by Sir Thomas Deane on the Construction of Buildings for the Accommodation of Audiences.
3. Mr. E. Hodgkinson, on the Law of Defective Electricity of Iron and Stone.
4. Mr. J. S. Russel, Report on the Forms of Ships.
5. Mr. Russel, on the Resistance of Railway Trains.
6. Mr. J. Bateman read a paper on the Collection of Water for the Supply of Towns.
7. Mr. Bridges read a paper on Wooden Railways. The author contended that the introduction of wood for the purpose of railways would materially diminish the cost of their construction, but there were two essentials to be attended to,—1. The chemical transmutation of the fibres of the wood into a more durable, hard, and almost incorruptible substance; and, 2, the employment of a level guide-wheel fixed at an oblique angle before and behind each carriage, as a substitute for the flange, which is the main cause of the wear and tear in existing railways. By means of this guide-wheel the bearing and carriage-wheel would be quite flat, obviating all abrasion of the wood as well as tendency to oscillation, each acting independently, as with the wheels of an ordinary carriage. The process by which the wood is chemically transmuted is the injection of two alkaline and metallic salts, which, as it were, fossilizes the wood. The advantages of its introduction into Ireland were particularly alluded to.
8. Mr. Baron described an improved Life-boat.
9. Mr. Bermingham read a paper on Turning Canals into Railways. His views were more particularly directed to the Royal Canal in Ireland, with the purpose of connecting the river Shannon with Dublin by that means. He proposed to construct a railroad in the canal and make sewers in the centre of the bottom, by which the waters of the country could be brought away, and in their progress from the summit levels to the Shannon on one side, and the sea at Dublin on the other, to make use of this water at each of the present locks to assist the trains in surmounting the inclined plane which he proposed to form in their stead.
10. Mr. Bowness described a plan for drawing coals from pits without ropes. The principle was similar to that of drawing water, the coals being brought up by buckets, through the instrumentality of a scale down the centre and a slide on each side, put into impulse by the steam engine.
11. Professor Oliver Byrne described a new set of compasses, invented by M. Le Sire Lebrun, which comprised within themselves a whole case of instruments.
12. Professor Byrne described a new invention by M. Le Dru, of Paris, of cold-drawn iron pipes, specimens of which were exhibited at the late exposition at Paris.
13. Mr. Perigal read a paper on a process supposed to have been used in the construction of the Pyramids. A similar plan has previously been mentioned as that by which Stonehenge was erected, by considerable manual power being employed in their conveyance on rollers.
14. Dr. Greene described Mr. Nasmyth's steam-hammer, an ingenious invention in the fabrication of wrought iron. The one referred to was five tons weight, which, in a fall of seven or eight feet, made one hundred strokes in a minute on an anvil of seven or eight tons weight. It was much admired for its simplicity as well as ingenuity.
15. Mr. Fairbairn read a paper on the combustion of smoke. To shew the importance of the removal of this nuisance, it had been calculated that in Manchester alone a saving of 300,000*l.* per annum in the cost of soap alone would be effected, if this were accomplished.

SECTION G.—MECHANICAL SCIENCE.

WYLSON'S SCANTLOMETER.

President—George Rennie, F.R.S.

Mr. J. Scott Russell, F.R.S., Ed., and one of the vice-presidents of this section, read the first paper on the list, "On a New Scantlometer." Mr. Russell said this was a communication which had been sent in by Mr. Wylson, a gentlemen of the architectural profession, and who unfortunately was not present. The scantlometer is the result of an attempt to meet a deficiency which exists as to the means of ascertaining the scantlings (or depths and thickness) of timbers used in buildings, and which is of this nature:—None but men of mathematical acquirements can calculate the exact depths which, in a timber of a given thickness, is requisite for a given span, or the exact thickness necessary for one of a given depth to the same span, or the length which may just, with safety, be spanned by one or both of a given depth and thickness. And for those who have not the advantage of possessing this branch of education, there is but one way of acquiring the capability of determining questions of this description, namely, long experience and observation of what has been sufficient in similar cases. But of those who have occasion for such knowledge, the portion who have thus overcome the want of the more legitimate method is considerably the smaller; and the remainder, consisting, perhaps, chiefly of the rising generation of carpenters, but including also, in no small degree, men following the professions of architecture and house-surveying, have neither the one way nor the other of resolving, by themselves, the true requisites in these frequently recurring cases. It is mainly for the use of these, then, and also to obviate the necessity for calculation, to those who solve their questions by that means, that this contrivance is intended. This instrument has been invented for giving the scantlings of joists and rafters only, these having a relation to each other, and being of more frequent occurrence than the other timbers in carpentry, but for which similar provision can without difficulty be made. It consists of two diagrams or scales, both of which are generally wanted; the upper one comprehends timbers of the minimum thickness and maximum depth, embracing bearings up to 25 feet; the lower one gives equivalent scantlings from the minimum up to the maximum of thickness. The scant-